REMARKS

In view of the amendments to the claims, Examiner is respectfully requested to reconsider and to withdraw the stated informality objections to claims 1 and 3 and the rejection to claims 2-4, 7 and 10 under 35 U.S.C. 112, as set forth on pages 2 and 3 of the Examiner's letter of January 27, 2004. The claims as amended are now believed to be in full compliance and are submitted as fully and clearly setting forth to those skilled in the art, the essence of the applicants' invention.

The notation by the Examiner of these deficiencies in the claims is noted with appreciation.

Applicants submit that the present invention in summary comprises a novel method whereby sodium carbonate values resident in various streams, composed of a variety of sodium carbonate and sodium bicarbonate concentrations, are combined and selectively introduced into a process that recovers the sodium carbonate as sodium carbonate decahydrate or sodium carbonate monohydrate crystals. The more significant elements of the improvement provided by the invention comprise:

1. Extending surface evaporation pond life by dissolving the naturally occurring deposit of sodium carbonate decahydrate in the pond. Additionally, the process returns only a single purge stream depleted in sodium carbonate and concentrated in soluble impurities back to the ponds.
2. Recovery of sodium carbonate decahydrate deposits resident in surface evaporation ponds used as a sodium carbonate source to concentrate other sodium carbonate bearing streams in a proportion to suitably feed either a sodium carbonate monohydrate or sodium carbonate decahydrate process.
3. Combining a variety of sodium carbonate bearing streams in a proportion that avoids processing costs (evaporative concentration/decarbonization/neutralization) and sequential crystallization processes as necessary steps to recover soda ash from process streams.
4. Utilizing a portion of the sodium carbonate bearing stream with sodium bicarbonate concentrations sufficiently low to be decarbonized by stream stripping which then can be processed to recover sodium carbonate without employing evaporative concentration or causticization neutralization processing steps.

5. Selectively combining, at a plurality of points, various streams of sodium carbonate/sodium bicarbonate concentration, to adjust feed stream composition, so that sodium carbonate is recovered efficiently using either a sodium carbonate monohydrate crystallizer or sodium carbonate decahydrate crystallizer, or both. And, in so doing, avoiding the constraints of sequential crystallization and/or the restraint of resulting mother liquor concentration that occur in processes employed by the prior art, such as those of the cited references.
6. Applies a system wherein the hot saturated purge from the monohydrate evaporator is utilized as a sodium carbonate source to concentrate other sodium carbonate bearing streams to suitably feed either a sodium carbonate monohydrate or sodium carbonate decahydrate crystallizer.
7. Combining a means wherein sodium carbonate bearing streams are combined with the mother liquor and/or purge stream of the monohydrate crystallizer to dilute the concentration of sodium bicarbonate. This avoids the costs of the kind incurred by the prior art that depend upon evaporation energy to concentrate sodium carbonate, to decarbonize sodium bicarbonate, and for causticization neutralization as necessary steps prior to feeding the first crystallization step.
8. Combing sodium carbonate bearing streams with the mother liquor and/or purge stream of the monohydrate crystallizer thereby diluting the soluble impurities introduced into the system resulting in a sodium carbonate bearing stream suitable for feeding either a sodium carbonate monohydrate or sodium carbonate decahydrate unit.

Such improvements in processing technology, provided by the present invention, are not disclosed or taught by the combination of prior art disclosures.

Examiner is accordingly respectfully requested to reconsider the rejection of claims 1-9 and 11 as being unpatentable under 35 U.S.C. 103(a) over the Copenhofer '054 in view of Dome '882, the rejection of claims 1, 2, 4-9 and 11 under 35 U.S.C. 103(a) as being unpatentable over Frint '134 in view of Dome '882 and the rejection of claims 1, 2, 4-9 and 11 under 35 U.S.C. 103(a) as unpatentable over Smith '497 in view of Dome '882, respectively.

None of the cited prior art combinations discloses or teaches or renders obvious the claimed invention nor the advantages thereof such as the extension of pond life by utilization of pond deposit recovery or depleted purge streams, for example.

None of the cited primary references, Copenhafer '054 or Frint '134 or Smith '497, disclose or teach recovery of sodium carbonate from streams that differ from streams that are derived from those formed by the dissolution of trona in water, i.e., none teach or utilize the introduction of other streams to recover sodium carbonate values therein.

With respect to the secondary reference Dome, the present invention is an improvement the disclosure of this patent which is commonly owned by the assignee of the present invention. Dome, teaches soda ash recovery from dilute waste streams prior to the stream reporting to the ponds. Dome does not utilize nor teach the advantage of dissolving the existing sodium carbonate deposit as an effective way to extend pond life. Moreover, Dome does not utilize nor teach the advantage of introducing other sodium carbonate bearing streams at a point different than those used before the initial processing step. In essence, none of Copenhafer, Frint or Smith utilize or teach the advantage of recovering sodium carbonate by introducing other sodium carbonate bearing streams. Moreover, if such streams were introduced into the patented processes, the stream would necessarily be introduced before the initial processing step and because of attendant evaporation / decarbonization / neutralization costs would render such systems impractical.

Applicants submit, accordingly, that even with the benefit of suggestions from the disclosure of the present invention, the combined referenced disclosures do not teach how to integrate the systems of the secondary reference with the primary reference, nor how they are to be modified to provide the invention now specifically claimed.

Respectfully submitted,

Arthur J. Plantamura
Attorney for Applicant
Reg. No. 17724